

ESSENTIALS OF HYPERTENSION

A Review of the Sixth Report of the Joint
National Committee on Prevention,
Detection, Evaluation, and Treatment of
High Blood Pressure

&

Selected Topics in the Clinical Management
of Hypertension

HYPERTENSION

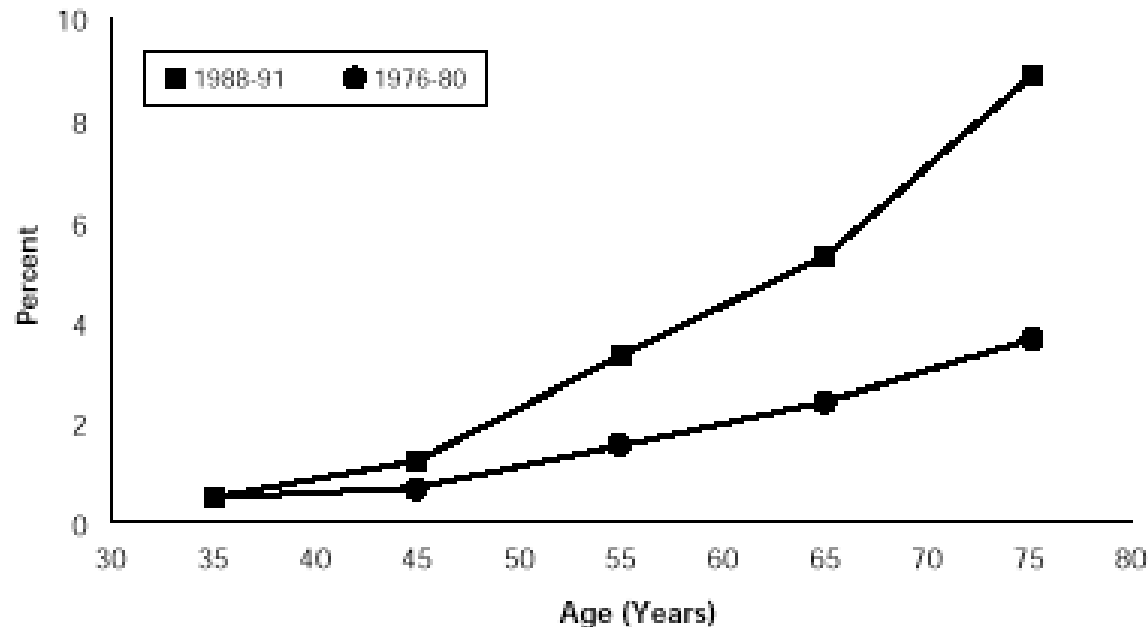
Reasons for Concern

- 43 million people with hypertension
- 50% women
- 35% hypertensive pts unaware of their condition
- Only 21% treated patients have reached a goal BP of $< 140/90$ [NHANES III]
- Incidence of CHF and ESRD is rising.
- Age adjusted stroke rates have risen slightly since 1993 and age adjusted decline in CHD has leveled.

HYPERTENSION

Heart Failure

PREVALENCE OF HEART FAILURE, BY AGE, 1976-80 AND 1988-91

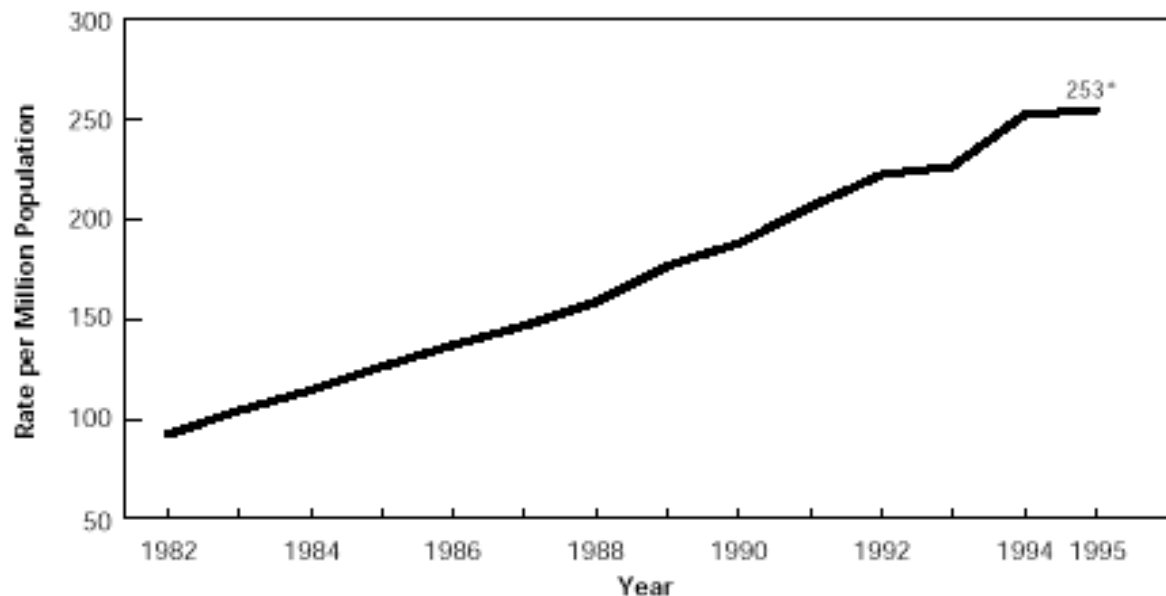


Source: National Health and Nutrition Examination Survey (1976-80 and 1988-91), National Center for Health Statistics.

HYPERTENSION

End Stage Renal Disease

INCIDENCE RATES PER MILLION POPULATION OF REPORTED
END-STAGE RENAL DISEASE THERAPY, 1982-95, ADJUSTED
FOR AGE, RACE, AND SEX



*Provisional data.

Source: U.S. Renal Data System, 1997.⁶

HYPERTENSION

Reasons for Concern

- Racial differences:
 - 18 fold increase in hypertensive renal disease in black vs. whites (progression even with good BP control)
 - LVH 2-4X more prevalent among African Americans
 - Hypertension more prevalent among African Americans than other racial and ethnic groups.
 - No specific Rx recommendations can be made at present although CCB appears to provide the greatest reduction in BP among subpopulations of hypertensive patients.

HYPERTENSION

Gender

- CAD is leading cause (30%) death for women. Attributable risk for hypertension mediated CAD approaches 70% for women vs 60% for men.
- Significant lack of data from large population well controlled studies concerning gender differences in terms clinical outcome of treatment choices and effectiveness of control.
- Data supports gender considerations in designing therapeutic approaches.

HYPERTENSION

Gender

- Diuretics (thiazides)
 - Effective, particularly in African American women and the elderly
 - Evidence to support a “protective” action on development of osteoporosis.
 - Thiazides decrease urinary excretion of calcium
- Oral estrogen replacement with/without medroxy progesterone or medroxy progesterone acetate has no significant effect on blood pressure.

Classification of Blood Pressure

Adults > 18 Years of Age

Category	Systolic(mmHg)	Diastolic (mmHg)
Optimal	<120	and <80
Normal	<130	and <85
High-Normal	130-139	or 85-89
HYPERTENSION		
Stage 1	140-159	or 90-99
Stage 2	160-179	or 100-109
Stage 3	=180	or =110

RECOMMENDATIONS BASED ON INITIAL BLOOD PRESSURE

INITIAL BP (mmHg)		FOLLOWUP
Systolic	Diastolic	
<130	<85	Recheck 2 years
130-139	85-89	Recheck 1 year
140-159	90-99	Recheck 2 months
160-179	100-109	Evaluate or refer in 1 month
≥180	≥110	Evaluate/refer in immediately or 1 wk

RISK STRATIFICATION

JNC VI 1997

- RISK GROUP A
 - No risk factors
 - No target organ damage
 - No clinical cardiovascular disease
- RISK GROUP B
 - At least 1 risk factor; not including DM
 - No target organ damage
 - No clinical cardiovascular disease
- RISK GROUP C
 - Target organ damage/clinical cardiovascular disease and/or DM
 - $\pm$ Other risk factors

CARDIOVASCULAR RISK ASSESSMENT

- MAJOR RISK FACTORS
 - Tobacco abuse
 - Dyslipidemia
 - Diabetes Mellitus
 - Sex (male and postmenopausal female)
 - Family Hx. of CV disease: female $\leq$ age 65, male $\leq$ age 55
- These conditions independently modify the risk for the future development of cardiovascular disease

CARDIOVASCULAR RISK ASSESSMENT

- Target Organ Damage/ Clinical CV Disease
 - LVH
 - CHF
 - CAD
 - Stroke
 - TIA
 - Peripheral Vascular Disease
 - Renal Insufficiency
 - Retinopathy

TREATMENT BASED ON RISK ASSESSMENT

STAGES Blood Pressure (mmHg)	Risk Group A	Risk Group B	Risk Group C
High-normal 130-139/85-89	Lifestyle	Lifestyle	Drug Therapy
Stage 1 140-159/90-99	Lifestyle (max. 1 year)	Lifestyle (max. 6 months) multiple risks:drugs	Drug Therapy
Stage 2 & 3 =160/=100	Drug Therapy	Drug Therapy	Drug Therapy

JNC VI 1997

LIFE STYLE: Goal <140/90 or lower



Goal not attained: Continue lifestyle modification, consider initial drug selection, choice based on presence of complications, special situations, and specific indications.



Initial choice: diuretics & β -blockers (study based). Special situations : DM (ACE) Heart failure (ACE, diuretics), Isolated systolic BP (diuretics, CCB), AMI

(β -blocker, ACE)

Start with low dose single agent (long acting if possible) & titrate. Low dose

combinations should also be considered.:



BP > 140/90 (or
other goal)

Add second class agent

Substitute new class agent



Goal not attained: Titrate dose, add additional agents with different mechanisms of action. Consider additional tests.



JNC VI 1997

LIFESTYLE

Recommended Modifications

- Monitored weight reduction
 - body mass index ≥ 27 correlated with $\uparrow$ BP
- Increase physical aerobic activity
- Adequate daily intake of potassium, magnesium, calcium
- Reduce sodium intake ≥ 6 gram salt diet (2.4 g sodium)*
 - salt sensitivity (50%)
- Reduce ETOH intake to 1 oz (30mL) for men and 0.5oz for women and lighter weight men.
- Reduce intake cholesterol and saturated fats

ALCOHOL and BLOOD PRESSURE

- Individuals with > two drinks/day have 1.5-2 X increase in incidence of hypertension.
- Dose related: most prominent with > five drinks/day
- Estimated that 11% of cases hypertension in males is due to excess ETOH intake.
- Prolonged abstinence can ↓ blood pressure.
- Recurrent ↑ blood pressure when ETOH restarted.

BLOOD PRESSURE

Smoking & Caffeine

- Caffeine & smoking can cause acute $\uparrow$ in BP ≥ 10 mmHg,
- Neither smoking or caffeine use associated with $\uparrow$ incidence of hypertension.
- Acute effect caffeine attenuated with chronic use but potentates ($\cong 5$ mmHg) the $\uparrow$ BP with stress.
- Cigarette smoking repeatedly produces transient $\uparrow$ in BP (5-10-20mmHg)
- Combination of smoking and coffee drinking in pts with Stage I hypertension may $\uparrow$ systolic BP by 6mmHg.

COMBINATION vs MONOTHERAPY

- Response
 - 75% ↔ 85% combination
 - 50% ↔ 60% full dose single drug
- Subjective and Metabolic side effects are less frequent and severe with lower doses of agents.
- Frequency of office visits may be reduced.
- More rapid control of BP (pt compliance)
- If BP controlled for one year may consider withdrawal of 1 agent.

ISOLATED SYSTOLIC HYPERTENSION

- Systolic > 160 mmHg & diastolic < 90 mmHg\
- Older population [Framingham study: ISH 65%-75% hypertension cases in the elderly.]
- Associated with 2 - 4 fold $\uparrow$ risk for MI, LVH, CVA, and cardiovascular mortality.
- Cardiovascular risk correlates closer with systolic than diastolic pressure.
- Systolic pressure is a risk factor independent of vascular stiffness. [not simply a marker of vasc. disease.]

ISOLATED SYSTOLIC HYPERTENSION

- Low dose thiazide therapy: preferred initial Rx. [SHEP]
- No evidence that reduction in diastolic pressure resulted in adverse effects.
- Additional agents may be required
 - Long acting dihydropyridine calcium antagonists
 - beta blocker
- Initial goal is at least a reduction to 160 mmHg in patients with marked systolic hypertension.

DIASTOLIC BLOOD PRESSURE

- Increasing risk for stroke and CAD with DBP > 75mmHg.
- Evidence for J curve and cardiac complications is incomplete. Pts at greatest risk include those with evidence of ischemic heart disease and LVH.
- No J curve for stroke.
- Reasonable goal is DBP of 85mmHg. In pts with known CAD consider initial reduction to be 10mmHg below baseline. Advance as tolerated.

DIASTOLIC BLOOD PRESSURE

- Reductions in DBP below 85mmHg should be considered in:
 - Black patients who appear to have continued target organ damage with DBP in 85-90 mmHg range.
 - Pts. with initial DPB 90 -94 who benefit from ↓ of about 10 mmHg.
 - Pts. with progressive renal insufficiency.
 - Pts. with DM and concomitant hypertension, even at the lower levels of Stage 1.

HYPERTENSIVE URGENCIES

Severe Asymptomatic Hypertension

- Upper limits of Stage 3 hypertension.
- No symptoms or evidence of new or progressive target organ damage.
- Rarely requires emergency treatment.
- Goal is reduction in BP to $\leq 160/110-100$ over several hours with oral therapy.
- Rest in quiet environment & loop diuretic (20-40mg furosemide) then additional agents: β blocker, CCB, α_2 -agonist.

ANTIHYPERTENSIVE THERAPY

Withdrawal Syndromes

- Discontinuation of Rx usually safe with exception of alpha-2-agonist *clonidine* or a β -adrenergic blocker.
 - Increased sympathetic activity probably due to the upregulation of adrenergic receptors.
 - Receptor down regulation has a half-life of 24-36 hours.
 - Hyperadrenergic state persists longer than drug effects of the shorter-acting agents.

ANTIHYPERTENSIVE THERAPY

Withdrawal Syndromes

- Abrupt cessation of *clonidine* induces acute rebound hypertension above the pretreatment level.
 - Usually occurs with larger oral doses, observed with transdermal administration. May occur with gradual withdrawal.
- Beta blockade withdrawal in patients with CAD can cause accelerated angina, myocardial infarction, or sudden death.
- Discontinue drugs over 6-10 day periods with reduction of dose by 1/2 every 2-3 days.

HYPERTENSION

Lack of Adequate Response to Therapy

- Non compliance
- Inadequate measurement
- “White-coat” hypertension
- Smoking
- Increasing obesity
- ETOH abuse (>1oz/day)
- Insulin (⬆ levels)
- Anxiety (panic)
- Chronic pain
- Volume
 - sodium intake
 - renal insufficiency
 - sodium retention (drug)
 - diuretic requirement
- Drugs
 - inappropriate choice
 - insufficient dose
 - rapid metabolism
 - ineffective combination

HYPERTENSION

Lack of Adequate Response to Therapy

- **DRUGS**

- Sympathomimetics (nasal decongestants, appetite suppressants)
- Oral contraceptives
- Cocaine (other recreational drugs)
- NSAIDS* (direct renal effects)
- Steroids
- Antidepressants
- Cyclosporine, Tacrolimus
- Caffeine
- Tobacco (licorice in chewing tobacco, smoking prior to BP measurement)

HYPERTENSION & Diabetes Mellitus

- Common
 - Type 1 DM: Incidence rises from 5% at 10 yrs, to 33% at 20 yrs, and 70% at 40 yrs.
 - Type 2 DM: Approximately 40% hypertensive at diagnosis, with about 1/2 hypertensive before onset of microalbuminuria. Strongly associated with obesity in this pt. population.
- Type 1 DM
 - Close relationship between BP & diabetic renal disease

HYPERTENSION & Diabetes Mellitus

- Type 1 DM
 - In 30 -39 yr/old group hypertension is noted in only 2-3% of pts without clinically apparent renal disease.
 - BP ↗ within the normal range about 3yrs after appearance of microalbuminuria.
 - Incidence of hypertension: 15%-25% with microalbuminuria; 75%-85% with diabetic nephropathy.
 - Family history important. (nephropathy, hypertension)
 - Blacks at greatest risk for diabetic nephropathy.

HYPERTENSION & Diabetes Mellitus

- Early treatment essential.
 - Remember to check for autonomic neuropathy
 - Initial therapy [absent renal disease]
 - weight reduction, exercise, sodium restriction, avoidance of smoking and excess ETOH ingestion.
 - Potential antihypertensive effect from metformin and other agents that improve insulin sensitivity.
- Choice of Agents
 - Based on efficiency and side effect profile

HYPERTENSION

&

Diabetes Mellitus

- ACE inhibitors*
 - Renal protective. Diminish proteinuria.
 - Increase responsiveness to insulin.
 - No adverse effect on lipids.
 - May cause ↑ in potassium.
- Calcium Channel Blockers*
 - Diltiazem & verapamil decrease proteinuria
 - Long term effect on renal function not known.
 - No adverse effects on lipid or carbohydrate metabolism.

HYPERTENSION

&

Diabetes Mellitus

- Low dose thiazide (12.5 -25 mg [max] hydrochlorothiazide.
 - low dose minimizes adverse effects on lipids and glucose utilization.
 - Reverses mild volume expansion.
 - May be particularly beneficial in black pts.
- Peripheral alpha blockers
 - may be of use in special situations: lower BP, increase insulin sensitivity, modestly lower lipid levels.

HYPERTENSION

&

Diabetes Mellitus

- Beta Blockers
 - Mask early symptoms of hypoglycemia
 - Nonselective beta-blockers slow rate of recovery from hypoglycemia.
 - May worsen clinical manifestations of peripheral vascular disease.
- GOAL BLOOD PRESSURE
 - Systolic pressure below 140 and diastolic below 85mmHg. May actually benefit from lower pressures.